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ABSTRACT

A partial review of child development literature is presented to examine patterns of psychological development in the infant from birth to 18 months of age. An attempt is made to present several major statements about infant psychological development and to provide empirical support for the statements that contradict traditional views. Instances and patterns in infant psychological development are identified through reports of research results of early reciprocal interactions among caretaker, infant, and environment. The infant's psychological development is characterized by affects, states, and dispositional tendencies inferred from observable behavior. These displays are considered important cues for noting physical, mental, and social well-being of the infant within his or her immediate environmental context and with a reciprocal interaction event. As temporal events, infant affects, states, and dispositional tendencies suggest psychological change, growth, and differentiation over time and do not imply fixed characteristics of infant personality. It is concluded that the infant is highly individualistic, competent, adaptive and active as an agent and a recipient in reciprocal interactions with caretaker and environment. (Author/MS)

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Psychological Development of the Infant: Reciprocal Interactions Among Caretaker, Infant, and Environment

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Abstract

A partial review of child development literature is presented to examine patterns of psychological development in the infant from birth to eighteen months. Pattern components that may be observed in infant behavior include affect presentations, state displays, and dispositional tendencies. These pattern components are discussed in reference to the impact of reciprocal interactions of caretaker, infant, and environment.

Caretaker Variables. The caretaker is of functional significance to the infant in her nurturing, protecting, and stimulating roles. Variables that appear as strong determinants of the caretaker's effectiveness in achieving these role-tasks include cultural and subcultural factors, caretaker background, personality, and attitudes, and level of caretaker perception and responsiveness. The adequacy of caretaker behavior in reciprocal interaction with the infant is greatly influenced by the satisfaction and pleasure derived from the caretaker-infant relationship and the caretaker's capacity to know and to manage for the infant's needs. Wholesomeness in the early development of healthy interactional patterns with the infant appears to originate from caretaker attitudes and perceptions--especially the attitudes of positiveness and optimism about the infant and herself the caretaker.

Infant Variables. The fact that infants differ in levels of competency and adaptational abilities clarifies in part the basis for each infant's behavioral responses. The infant's behavioral responses as agent and recipient in reciprocal interactions affect both caretaker and the infant's exper-

iencing the environment. The power of another major variable perceived in early reciprocal interactions is the infant's shaping and controlling ability to elicit social responses. The variable of social responsiveness of the infant as a factor in reciprocal interactions has been given less attention than the caretaker variables.

Environmental Variables. Numerous, varied, and complex factors from perceptual, physical, and social environments may separately, or in interaction, impinge on the infant, caretaker, or both. One important way of analyzing the weight of these factors in reciprocal interactions between caretaker and infant is to equate the early infant environment with the quantity and quality of maternal care. Particular variables operant on the early environment could then be described as to affect characteristics of reciprocal interactions, level of relationship established between infant and caretaker, amount of caretaker sensitivity to infant, personality characteristics of caretaker, and consistency and predictability of caretaker behaviors.

Psychological Development of the Infant: Reciprocal Interactions Among Caretaker, Infant, and Environment

Overview

Traditional views of the development and functioning of the infant from birth to eighteen months have maintained a common-mold stereotype of the infant. Typical views of the infant can be expressed as follows:

> Babies are all alike. Infants are helpless and need good mothers to care for them. Teaching a baby is a long, tedious chore. Babies must be taught everything and be told many times what is expected.

The partial truths embodied in such traditional views are now being questioned. Research in areas of perception, developmental psychology, child development, education, and sociology has already revealed the infant's early phenomenal capacities and abilities in affective, cognitive, and psychomotor domains. The focus in this review is on the affective domain.

First, an attempt is made to present several major statements about the psychological development of the 0 - 18 month infant and to provide empirical support for the statements that contradict traditional views. Secondly, an attempt is made to identify instances and patterns in infant psychological development by reporting research results of early reciprocal interactions among caretaker, infant, and environment. The infant's psycho-

logical development is characterized by affects, states, and dispositional tendencies inferred from observable behavior. These displays are considered important cues for noting physical, mental, and social well-being of the infant within his immediate environmental context and with a reciprocal interaction event. As temporal events, infant affects, states, and dispositional tendencies suggest psychological change, growth, and differentiation over time and do not imply fixed characteristics of infant personality.

Finally, a summary statement is made that generally tends to raise more questions about investigation in the area of infant psychological development.

Statement of Problem

"What psychological developments in the infant may be observed as results of early reciprocal interactions among caretaker, infant, and environment?" The child development literature is reviewed to identify instances and patterns of psychological development in the neonate to eighteen month infant.

Operational Definitions

(1) Psychological development: This term refers to the infant's presentation of one or a set (two or more) of observable behaviors that can be identified as an affect, a state, or a dispositional tendency.

(a) Affect: This is synonymous with exhibition of feeling. The infant manifests through specific, overt behaviors his feelings, moods, and emotions. Examples of affects observable in the 0 - 18 month infant behaviors include smiling, laughing, crying, fretting, playing, cooing, and clinging.

Gewirtz (1968, p. 178) contributes the following description of affect. " 'Feelings' and 'affects' imply responses by one of the interactors which provide stimuli that are discriminated by the other interactor and that control his behaviors." Examples which clarify Gewirtz's definition are those responses that are physically observable and that are effects upon the sensory-perceptual receptors.

(b) State: State refers to a condition, an ability or a status as determined from an observed sequence of behaviors, presented in a relatively consistent way, and presented over a span of time to suggest a stability of that behavior. Examples of infant states would include executive competence,

attachment, exploration, obedience, separation anxiety, fearfulness, and visual attentiveness.

Brown (1973, p. 34) defines state as the combination of infant behaviors which reflect both infant need and infant availability for contact with the external environment. According to Brown, a state is characterized by variable tension and arousal conditions in the infant which may be noted by several physically observable and measurable cues. These cues are amount and type of motor activity, nature of respirations and vocalizations, changes in skin coloration, and openness or closure of eyes.

(c) Dispositional tendency: This term refers to an observed behavior that is relatively variable in nature, inconsistent in appearance, and generally less stable in the infant's behavioral repertoire than a state behavior. The fluid and inconstant nature of a dispositional behavior implies infant inclination toward a condition, an ability, or a status at a given point in time. Examples of dispositional tendencies noted in the literature include dependent, anxious, obedient, fearful, competent, attached, and venturesome or explorative behaviors.

Heider (1971, p. 90) made reference to a disposition concept as "not necessarily describing an existing deviation from optimal functioning or forecasting later malfunction in a given case, but indicating a potentiality that may or may not be realized, depending on the occurrence or nonoccurrence of conditions, often unpredictable conditions in the child's life."

(2) Early reciprocal interactions: Early refers to the first eighteen months of infant life. Reciprocal interactions are identified as exchanges between actors and recipients in their effecting and responding experiences

with the environment. The exchange might incorporate feeling or affective stimulus-response messages, physical stimulus-response acts, or both.

(a) The reciprocal aspect of interaction is important in suggesting the exchange of behavioral responses in a complementary or shared give-and-take experience. Basic to the recognition of reciprocal interaction is the understanding of the antecedent-consequence behavioral relationship notion. This notion, oriented to cause-effect-cause behavior chains and physically observable events that surface directly from an espoused cause, cannot explain the multi-level, all-pervasive impact of the infant's greatly complex environment on the infant's behavioral responses.

(b) Actors and recipients: Generally, actor may be associated with the concept of one who, or that which, effects the environment, serves as a stimulus, or functions in a catalytic or facilitative fashion. Recipient may be associated with the concept of one who, or that which, receives, or responds, or is affected by the action.

It is preferable in relation to the infant's interactions with his environment to note the continuous altering of actor-recipient roles in such rapid exchanges that one frequently and easily loses track of the sequence, complexity, subtlety, and sophistication, and shifts in focus of behavioral responses.

(c) Effecting and responding: Effecting implies operating on, performing, executing, or doing in a stimulus-response context. Responding implies the attending, answering, and reacting to the effecting operation.

In relation to the infant's interactions with his environment, it is preferable to be aware of the highly variable nature of effects and responses,

the multitude of exchanges that occur in even a brief interval, the multi-level and multi-directional thrusts of effects and responses, and the weight they bear on affective or feeling concerns, on physical acts, or both.

(3) Caretaker: This term refers to that person or persons who has charge of the infant. The caretaker may be the natural mother or father, or both, a family relative, or one appointed to manage for the infant. The caretaker is a force from the human environment that may elicit affective and physical responses from the infant by way of several self-projecting factors. These factors include the individual caretaker's (a) physical appearance, (b) particular personality traits, (c) abilities in caregiving, (d) styles of interacting, and (e) history of successful interpersonal relationships.

(4) Infant: This term covers the neonate and the baby up to eighteen months of age. Neonate, or newly born, has been defined (Broussard & Hartner, 1971, p. 433) as the first 21 days of life.

(5) Environment: The environment of the infant consists of the inanimate sources of stimulation, the animate and human environment, and socio-philosophical-historical treatments.

Inanimate sources of stimulation include objects, events, and the general physical environmental context that impinge on the sensory-perceptual receptors. Animate sources of environmental stimulation include distinctly human contacts with caretaker, family, and outsiders. The socio-philosophical-historical treatments that serve as environmental stimuli refer to the socio-economic conditions, the cultural and class values and philosophies, and the management or practices adhered to in infant rearing.

Provence (1968, ch. 2), Robinson & Robinson (1965, p. 179) and Scott (1968, pp. 185-187) have taken the theoretical position that both infant development and infant learning are products of an interaction with the infant's inborn maturing system and forces in the environment. Though few behaviors would be dependent on only one of these two aspects, maturation and learning, learning cannot occur without sufficient growth and differentiation (Robinson & Robinson, 1965, p. 179). Scott (1968, pp. 185-187) has proposed that a critical period for socialization might be controlled by the appearance of behavioral mechanisms that maintain or prevent contact with one's species.

The focus upon the infant's behavioral mechanisms or equipment for effecting and responding to the environment has led investigators to document early observations of previously unheard of and unusual abilities, skills, and differences among infants in the area of psychological development. It has been through examination of infant displays of affects, states, and dispositional tendencies in reciprocal interaction that more is known and more can be speculated about infant interactional relationships. Kessen (1974, pp. 12-19) in an overview of research in the psychological development of infants, has formulated four major propositions:

1. Infants are different from each other.
2. Infants are competent.
3. Infants exhibit early adaptive abilities.
4. The infant is active on the environment and relates to the caretaker in a reciprocal fashion.

Individual Differences

Identification of individual differences early in the infant's psychological development has interested a number of developmental investigators (Ainsworth, Bell, & Stayton, 1972; Bayley, 1973; Birns, 1973; Brown, 1973; Gesell & Ames, 1973; Heider, 1971; Kessen, 1974; Korner & Grobstein, 1971; Moss, Robson, & Pedersen, 1969; Murphy, 1973; Robinson & Robinson, 1965; Shirley, 1973).

From her longitudinal studies, Bailey (1973, pp. 45-51) has observed individual patterns along three dimensions: individual differences in overall rate of growth and development, individual structural differentiation at different rates, and individual functional differentiation at different rates. Gesell & Ames (1973, pp. 71-74) employed a behavioral traits scale for appraising evidence of individuality noted in infants at one year and five years of age. They found that particular fundamental traits of individuality exist early, persist late, and assert themselves under varying environmental conditions, with the "extrinsic environment impress[ing] circumstantial and topical configurations . . ." (Gesell & Ames, 1973, p. 74).

Shirley's (1973, pp. 83-90) longitudinal study of a wide variety of personality traits in twenty babies affirmed to her satisfaction that there are principles of personality development operating in babyhood. Specifically, she reported (a) that there were individual differences in personality behavior, (b) that the consistency of personality differences could be observed in a variety of situations, (c) that each baby exhibited behavioral traits in approximately the same proportions from one age to

to another, (d) that in instances of a behavioral response item being dropped, the behavioral response item that replaced it was qualitatively in keeping with the former, and (e) that each baby exhibited a characteristic pattern of personality that varied little irrespective of age.

Consistent individual differences in response intensity have been noted as early as the first few days of life (Birns, 1973, pp. 30-33). Based on her study, Birns felt that most babies could be characterized as slightly, moderately, or intensely responsive, irrespective of the nature of a stimulus or the modality approached.

Murphy (1973, pp. 76-77) was interested in examining basic determinants of coping styles among infants and over time developed four hypothetical clusters that describe response intensity patterns. Murphy believed the clusters, composed of different factors involved in an interaction, were illustrative of the infant's individual styles of coping with the environment. The response intensity pattern and the interactional effect an infant exhibits seem heavily dependent on the constitutional, hereditary, and genetic differences from child to child. Robinson & Robinson (1965, p. 173) have stated this concept as follows: "What injures one child may be weathered successfully by another who is physiologically and psychologically better prepared and may for yet another child call forth accelerated development."

Heider (1971, p. 105) viewed the response intensity pattern each infant presented as the product of the interaction between the nature of the event itself and the particular infant's pattern of strengths and weaknesses. An infant's level of vulnerability, balanced between stress

susceptibility and stress resistance (Heider, 1971, p. 91) and the infant's age at which an event occurred were two factors that Heider viewed as important in the intensity of response picture (Heider, 1971, p. 105).

Ainsworth, Bell, & Stayton (1972, pp. 123-144) examined individual differences in the development of attachment behaviors. Children of 3 - 54 weeks of age were observed and conspicuous differences were noted among the infants in their ways of organizing attachment behaviors. The specific attachment behaviors included crying, response to the mother's leaving and re-entering the room, and physical contact behaviors.

Individual differences have been reported for rates of overall physical growth and development, for differentiation of structures and functions at different rates, for fundamental personality traits, for response intensity patterns, coping styles, and levels of vulnerability, and for organization of attachment behaviors. These citations are only a few examples of individuality the infant presents. More will be noted in the following sections on competence, adaptation, and reciprocation.

Infant Competence

Kessen (1974, pp. 12-19) maintains the young infant is not incompetent and that the trend of research views the baby as an early coder of input, whose sensory and response capacities are quite attuned to environmental stimuli. Most of the research cited here in support of the competency proposition deals with state presentations and dispositional tendencies the infant exhibits.

Wolff (1973b) investigated neonates systematically and continuously to note any stable and distinguishable behavior patterns present. The assumption

was that these patterns might be primitive forerunners of perception, motivation, and communication processes. What Wolff (1973b, p. 268) did apparently establish was that "differentiated reflex predecessors of several behavior forms are already distinguishable in the first few days after birth". Certain early voluntary activities observed in the neonate, notably visual and auditory pursuit movements and arrest of activity upon stimulation may be the first reflex predecessors of voluntary activity that becomes intentional voluntary behavior in infancy and later years (Wolff, 1973b, p. 268).

In relationship to the infant's early motor activity, need states, and responsiveness, there was research support to suggest that the infant's motor expression threshold was controlled by an interaction between his level of need tension and the infant's responsiveness to peripheral stimulation (Wolff, 1973b, p. 266). In relationship to the infant's affect-expressive movement, the research findings supported the concept of the infant's being born with partly differentiated, distinguishable channels for discharging need tensions. In the neonatal period, the discharge of need tensions was conveyed by need-executive movements, such as fingersucking and rooting, and affect-expressive movements such as crying, smiling, and frowning (Wolff, 1973b, pp. 267-268).

Within these early reflex-type behaviors which appeared as non-intentional voluntary activities, the infant's competency in visual attending and alerting was identified by a number of perception investigators. Haith (1973, pp. 320-323) proposed that the infant may respond to visual stimulation on the basis of four hypothetical preprogrammed principles:

1. If alert, and light is not too bright, open eyes.
2. If eyes are open and see no light, search.
3. If one sees light but no edges, continue to search.
4. If one sees edges, hold and cross.

Wolff (1973 a, p. 307) has defined the attentive state as "the infant's general predisposition to respond adaptively to selected elements in a constantly changing environment". The infant's capacity for attention to the environment and the development of attention over the first month of life appeared to correlate with the absence of visceral excitation (Wolff, 1973a, p. 311), as noted in the first two weeks of life when gross motor activity seemed incompatible with attentive behavior.

Particular structural and dynamic determinants of attention apparently have altered by the end of the second week of life, as it was observed the infant could attend with well-practiced pursuit movements while general body activity continued (Wolff, 1973a, p. 311). A plausible explanation made was that the greater familiarity with behavioral aspects of a task the less attention required of the baby.

The maintenance of the baby's attention and general alert-responses to the environment may be controlled by presentation of interesting visual stimuli (Friedman, Carpenter, & Nagy, 1973; Korner & Grobstein, 1973; Wolff, 1973a). Wolff (1973a, p. 313) remarked on the power of objects meaningful to the child as sources for maintaining attention and especially the visual aspects of the objects. The visual environment afforded the baby by the caretaker's lifting the baby to shoulder level has served doubly to stop an infant's crying (recovery of the attention state) and to provide

an optimal learning opportunity of a visual panorama not yet explored (Korner & Grobstein, 1973, pp. 291-294).

Salapatek (1973, p. 631) reviewed the development of visual abilities and changes notable in the first seven-to-eight week period of infancy. Particular developments observed were in sustained binocular fusion; smiling elicited by specific, simple visual shapes; variable accommodation to objects at various distances; smooth sustained circular, horizontal, and vertical tracking; progress in visual acuity, and making of visual preferences.

The findings of T. G. R. Bower concerning visual processing capacities of two month olds lent support to the idea that these abilities were present in the infant before 50 to 60 days of age (Salapatek, 1973, p. 632) and were not results of experience. By way of Bower's findings, Salapatek reported the two month infant's ability to store information regarding specific, simple sizes and shapes, a tendency to store and respond to multiple features in a compound display, and the tendency to organize elements in a visual field.

In order for the infant to respond to, store, and organize elements in a visual field, the abilities to fixate visually and to pursue seem crucial. Visual fixation attempts by infants were reported in two studies in which the infant's eyes appeared to make a series of fixations on an object while it was in the visual field and some visually attentive infants turned their heads when the object moved out of the visual field (Bruner, 1973; Greenman, 1973).

Greenman (1973, pp. 323-326) presented data to show that the neonate

does have the capacity to follow a visual stimulus with his eyes within the first 96 hours after birth. There seemed to be an optimum period for visual following from the first moments of life up to 12 - 48 hours after which no additional increase of positive responses was noted. Dayton, Jr., Jones, Aiu, Rawson, Steele, & Rose (1973, pp. 369-373) and Tauber & Koffler (1973, pp. 373-376) also reported from their investigations that neonates exhibited visual acuity, the innate ability to perceive apparent motion, and a well-developed fixation reflex with apparent coordinated eye movement in the continuous pursuit of a single target.

In contrast to pursuit behaviors were the anticipation behaviors for approach of objects that Bruner (1973, pp. 577-578) has observed. The anticipation behaviors reflected change in general activity, heightened tension in the trunk, pumping up of arms, shoulders, and head, fixated gaze, actively working mouth, and a startle and blink reaction on contact with an object. All these behaviors were noted in infants from six days to four months of age. The mastery of reaching and grasping was reported achieved at approximately four and one-half months on the basis of coordinating hand and object. Bruner (1973, p. 578) noted that by seven months the infant had developed visual guidance as a tool and could at that time accommodate visual field targets by visually fixating on the object, not on the hand.

From the second to the third month of infant life, there were two major developments that Salapatek (1973, pp. 631-632) saw as significant. First, the infant had begun to attend to critical features of a face and to expand upon such definitive features. Secondly, the first evidence of memory for specific simple figures had appeared during the third month.

Kagan (1973, pp. 675-676) set forth the hypothetical schema construct which in essence clarifies the infant's distribution of attention and the development of a memory function. He reported that at the end of the second month fixation time was influenced by the degree of memory for a class of events that resembled an original event. Visual fixation to normal face stimuli was greatest between three and six months of age (Kagan, 1973, p. 678). In Lewis' (1973, pp. 648-654) investigation of the attentional power of facial stimuli, it was found that fixation time apparently varied on two bases--the schema development function and the realism of facial stimuli paralleling the infant's schema. Fantz (1973b), Kagan (1973), and Lewis (1973) were basically in agreement about discrepant events (component features of a stimulus not in keeping with the infant's schema) eliciting longer fixations than very familiar events.

Fantz (1973b, pp. 622-630) and Hershenson, Munsinger, & Kessen (1973, pp. 317-319) have found that infants of one to six months of age exhibited selective attention, visual preference, and differential fixation especially for patterns. Infants of less than one week of age up to six months showed strong preference for large, complex patterns over plain, unpatterned surfaces. "The high attention value of pattern relative to other stimulus variables . . ." does not conform to the usually held belief "that color, brightness, and size are primary sense qualities and that form perception is secondary and acquired" (Fantz, 1973b, p. 626).

The infant's adaptive visual interest in pattern complexity and feature arrangement aligned with social objects may serve him in gaining a primitive knowledge of his environment (Kagan, 1973, p. 623). Out of the use of his

early visual perception abilities and interests come early experiences that increase responsiveness to people and important environmental objects and surfaces.

A number of developmental investigators have explored the neonate's visual behaviors with reference to decremental and recovery processes (Bridger, 1973; Friedman, Carpenter, & Nagy, 1973; Kagan, 1973; Saayman, Ames, & Moffett, 1973; Siqueland, 1973). Bridger (1973, pp. 348-352) determined that neonates could habituate, or adapt, their responses to a consecutively repeated stimulus. Kagan (1973, p. 678) found that fixation decreased with consecutively repeated presentations of an original stimulus but increased markedly with a presentation of a variation of the original stimulus. The infant's responses both in increased attention and fixation to the novel stimulus properties versus the familiar stimulus properties (Saayman, Ames, & Moffett, 1973, p. 645), may suggest novelty is a powerful conditioning effect for infant exploration and learning about the environment (Siqueland, 1973, p. 673).

The response recovery in visual fixation that Friedman, Carpenter, & Nagy (1973, pp. 361-365) observed seemed to suggest some central habituation process may be involved in the infant's early visual experiences. If the hypothetical central habituation process was indeed a reality, it probably is an explanation for the infant's active search for and discrimination of the novel, for the infant's retaining a response capacity in the event of new, or unfamiliar, or varied stimuli presentations, and for the visual modality's plasticity and sensitivity to repetition and change.

Gibson (1973, pp. 615-617) remarked on the ability of the infant (6 - 12 months) to be trained in the visual modality. The training program focused on form discrimination produced impressive gains in infant visual skills and infant affect development. Visual skill gains included increase in duration of attention, visual regard, coordination for perception of units or sequential elements, and more direct and accurate motor approaches with greater variety of visual-tactual explorations.

As compared to the affect of the untrained subjects, the trained ones exhibited more amiable, interested, and quiet behaviors, more immediate and selective attention to the stimulus pattern with definite inhibition of extraneous body movements, and an adherence to details unnoticed in the untrained.

Aronson & Rosenbloom (1973) and Eisenberg (1973) were interested in infant auditory-visual space perception and organization of auditory behavior. Aronson & Rosenbloom (1973, pp. 703-707) did determine that infants as young as one month perceived in a common auditory-visual space, which suggests spatial coordination existed among the senses. The gradual appearance of head and eye orientations to a sound in the peripheral visual field was the basis for this determination.

Eisenberg (1973, p. 332) examined elements in the organization of auditory behavior and reported a fair certainty that most infants can differentiate sound along seven variables: bandwidth, duration, repetition rate, interstimulus interval frequency, intensity or sound pressure level, and dimensionality. The latter three are the only ones investigated to any degree for clarifying the organization of auditory behavior.

Eisenberg's review of the frequency variable studies pointed to the differential functional properties of low, high, and critical speech range frequencies and their affect on the infant in the first year of life, which may suggest for the infant particular psychological responses or feelings. Sound pressure, or intensity, level of an auditory signal appears to be processed in a similar pattern throughout life, and it appears the neonate requires sound level equal to adult threshold levels. The dimensional effects of auditory signals are distinctly noted on the infant by his overt reactions to arousal, motor reflex responses, facial grimacing, and cardiac reactions. The perceptual mechanisms controlling attentive behavior for auditory signals appear to be operant at birth, just as was true for visual signals.

Early Adaptive Abilities

Early adaptational abilities have been noted in the above contexts of individual infant differences and infant competencies, but not much has been written about early adaptation versus early learning.

Kessen (1973, pp. 12-19) pointed out that no one has demonstrated early learning in a controlled setting and that the experiential effects an infant exhibits to environmental stimuli may not be learning in either the classical conditioning or instrumental form. In fact, there probably is genuine neurological incapacity in the neonate for associative coding. An examination of the adaptive responses the infant has exhibited is the pertinent task, however.

Bruner's reference (1973, p. 581) to neonatal adaptivity in a feeding routine was noted in a reciprocation learning situation that occurred in the first ten days of life. Neonates raised in a conventional hospital nursery and switched at ten days to a home nursery with an individual caretaker were slower in adaptively responding to regular feeding schedules than neonates raised by a live-in one-to-one caretaker. The latter neonates had early adapted to the reciprocal interaction with one caretaker and presented less crying and greater adaptivity to feeding and sleep schedules.

Wolff (1973a, p. 307) saw the infant's attentive state as an adaptive response to a constantly varying environment. He also remarked on the adaptive type response the infant exhibited to very familiar tasks and patterns, suggesting possibly that particular structures become automatized.

Bridger (1973) and Friedman, Carpenter, & Nagy (1973) studied the neonate's habituation or adaptation system of responding to a consecutively repeated stimulus and suggested that there was some form of primitive learning in process in that the infant had learned not to respond to the familiar but to the novel, the unfamiliar, or a variation of the original. Kagan (1973, p. 678) added depth to understanding the phenomenon of adaptivity to the familiar with the discrepancy hypothesis, which held that the infant would not show adaptivity to a stimulus event if the components of that event were discrepant or nonparallel with the infant's schema development.

Gibson (1973, pp. 615-617) examined the infant's singular plasticity and adaptiveness in problem resolution of a reversal learning task. The 26 infants engaged in the training program for form discrimination also exhib-

ited great adaptivity for more and more rapid learning as the experiment progressed and their parents reported the infants had developed a great smoothness to lay adaptational situations in the home.

Though Heider (1971, p. 107) does not use the word adaptivity in her discussion of vulnerability shifts, the meaning is inherently present as she concluded that changes in environmental pressures and in ways of dealing with deficits and liabilities and in ways of using assets in self and environment affect the shift in infant vulnerability.

Infant as Agent and Recipient

Kessen (1974, pp 12-19) stated the old child model was that of the child as the recipient and reactive being. The new child model maintains that the child is active by nature and a problem solver and is quite adept at developing reciprocal relationships. This latter model seems to match the Piagetian view of the infant as an agent in a constant exchange with his environment, meeting and making demands, and busy in conflict resolution.

The infant is influential in shaping the behavior of caretaker and environmental forces by way of his individual differences, competencies, and adaptive abilities. An investigation of the infant's agent-recipient responses in reciprocal interaction will illuminate even further the complexity of the individual and processes which shape his psychological development. Particular stimulus-response effects that are commonly and frequently observed in the infant's reciprocal behaviors, especially during the first year of life, include a preponderance of visual attending and visual social

regarding, voicing, smiling, crying, obeying, and exploring.

The infant's visual attending, alertness, and responsiveness were observed by Ainsworth & Bell (1970), Coates, Anderson, & Hartup (1972), Fantz (1973a), Greenman (1973), Horowitz (1967), Korner & Grobstein (1973), Moss & Robson (1968), and Streissguth & Bee (1972).

Streissguth & Bee (1972, p. 174) reported White's finding that extra handling during the first month of life increased visual attentiveness of institutionalized infants. Increased visual attentiveness on the infant's part was one effect Greenman (1973, p. 326) noted of the infant's receiving holding and cuddling stimulation. The effect on the mother was that of pleasurable feelings from having her newborn look at her, thus strengthening the caretaker-infant relationship.

Korner & Grobstein (1973, pp. 291-294) found that shoulder positioning elicited visual alerting and scanning while soothing the baby and causing his crying to stop. Mutual visual regard, called vis-a-vis by Moss & Robson (1968, pp. 401-408), was assessed in one and three month infants as to amount of time spent in a test situation in viewing a geometric complex stimulus and a social stimulus. Naturalistic home observations were also made of mutual visual regard for caretaker and infant.

Maternal attitudes registered during pregnancy were significantly related to mutual visual regard scores obtained in the test situation for both sexes at one month of age and for girls only at three months. Since the three month scores for mutual visual regard were equivalent for both sexes, it seemed to the investigators that there might be some broader range of maternal attitudes and responses accounting for the results

rather than vis-a-vis interaction alone.

Fantz's (1973b, pp. 622-630) findings of the infant's visual preference, differential fixation, and acuity abilities have been discussed in the preceding text. Infants under one week of age up to six months show strong preference for complex facial configuration patterns. This may be an early adaptive consequence, says Fantz (1973b, p. 626), of the infant's having more visual contact with people and parts of the environment characterized by pattern complexity and social features.

Horowitz (1967, p. 29) reviewed studies by Rheingold, Spitz, and Ahrens and supplied information that shows how visually attentive and attuned to detail the infant appears to be, especially with reference to the complex facial configuration pattern. First, Rheingold remarked on the human face as a shiny, complex, and mobile object that alone could be a sufficiently interesting stimulus to maintain infant attention. Within that complex stimulus, the eyes are apparently the most interesting feature, as noted by Spitz in the baby's ceasing to smile if the adult's eyes were covered. Ahrens reported some evidence of the infant, with increasing age, to need to see more of the caretaker, or adult before smiling. This was observed in the two month infant who smiled on seeing the adult's eyes and forehead, the three month infant who smiled only when seeing the adult's eyes, forehead, and shoulders, and the five month and older infant who must see a full face and upper torso before smiling.

Movement, figure-ground contrast, and voice are other stimulus characteristics of the face that visually attract the infant and increase his

visual experiences with people (Fantz, 1973b, p. 628).

Fantz (1973b) considered looking by the infant to be an exploratory activity rather than a specific social response. Ainsworth did not argue this point but did indicate how the visual exploratory aspect may be impaired or promoted by social conditions.. Ainsworth & Bell (1970, pp. 49-67) reported measurable variations in infant visual attending and exploring responses which declined sharply when a stranger was present or when the caretaker was removed from the laboratory situation and the recovery of visual exploration when the caretaker returned.

Rubenstein (1967, pp. 1089-1100) also established that there was a positive relationship between a quantified measure of sensory-social stimuli (maternal attentiveness) and infant exploratory behavior. Infants who had received less varied stimulation were less responsive to novelty and exploration opportunities than infants who had received a high degree of varied stimulation.

Though there may not be a linear relationship between social stimulation and exploration, it has been established that maternal or caretaker behavior is a powerful force in determining much of the infant's social and psychological nature. Stern, Caldwell, Hersher, Lipton, & Richmond (1973) made a factor analytic study on a body of factors operant in the mother-infant dyad. Nine factors based on composites of mother's personality and behavior, child's personality and behavior, and child's mental and motor development were analyzed. The factorial pattern weights appeared to suggest "a causal sequence of relationships between the personality characteristics of the mother, the modes of maternal behavior she adopts,

and the responses and development of her infant" (Stern et al., 1973, p. 1110).

The quality of the mother's responses in reciprocal interaction with the infant that fosters feelings of acceptance, cooperation, and sensitivity to the infant's signals may be effective in developing infant obedience. Stayton, Hogan, & Ainsworth's (1971, pp. 1057-1069) study relates to the ethological view that children are primarily social and inclined toward obedience and comply with caretaker expectations rather than oppose them. The data from their study indicated infants complied with the caretaker's commands when mother was accepting, cooperative, and sensitive but did not show a strong compliance when mother employed verbal commands and physical intervention in a training and controlling fashion. The infant's use of internal control was positively related to floor freedom and the mother's accepting, cooperative, and sensitive responses.

These latter indices suggest a warmth and an affectional tie that Stayton et al. credit with fostering the infant's willingness to comply with parental signals.

Coates, Anderson, & Hartup (1972, pp. 213-229) examined attachment behaviors, all of which correspond with affectional tones, that infants exhibited towards mothers. These included visual regard of the mother, vocalizing to her, smiling at her, touching her, maintaining proximity, crying upon separation from her, and orienting toward the place of her departure. The authors reported a number of interrelations in the attachment behaviors that agree, in essense, with the Tennes & Lampl (1966) study.

The major finding of Tennes and Lampl's psychoanalytically oriented study was that infants exhibited positive behaviors toward mothers before exhibiting distress at mother separation and generalized that all infants do exhibit positive behaviors but all may not exhibit the distress.

Crying and voicing are two additional behavioral responses infants employ in reciprocal interactions. Turnure (1971, pp. 182-190) examined infant responses to a natural presentation of the mother's voice, to systematic distortions of the mother's voice, and to a stranger's voice. Infants' responses, photographically recorded, consisted of frowning, mouthing, vocalizing, and limb movement at three months during all stimuli, crying at six months during all stimuli, and by nine months, infants exhibited more motoric quiet than at the former two ages. However, at nine months, female babies showed greater activity than did male babies to presentation of the mother's normal voice.

It appeared that as a function of age voicing may be an important property associated with the caretaker. Infants apparently have developed a certain precision in auditory discrimination of others' voicing, and likewise exhibit discriminative crying and voicing. Fleener & Cairns (1970, pp. 215-223) reported from their study that infants of one year and older produced a discriminative crying on maternal separation that was not observed in infants of three to five months, six to eight months, and nine to eleven months.

The ethological explanation Fleener & Cairns (1970) cited for the discriminative voicing and crying was that this vocalization served as an inborn release mechanism to exercise maternal retrieval behaviors and to remove

particular conditions that evoked the vocalization. A second explanation given was that on abrupt interruption of ongoing response chains, heightened random activity including vocalization occurs. These two explanations seem much in line with the view of crying in the first half year to eight months of infancy that Bell & Ainsworth (1974) project.

From Bell & Ainsworth's (1974, p. 142) naturalistic, longitudinal study of infant crying and maternal responsiveness, crying in the first part of the infant's first year was viewed as a fixed-action pattern activated by intraorganismic and environmental factors. During this first phase, the consistency and promptness of the maternal response became associated with a decline in frequency and duration of infant crying. In the latter part of the first year, crying seemed to take on a directedness to the caretaker and to serve as a means of communication (Bell & Ainsworth, 1974, p. 143). The individual differences in crying by the end of the first year seemed to reflect a history of maternal responsiveness rather than constitutional differences in infant irritability.

Such findings stand in opposition to the popular belief that response to a baby's crying spoils him. Bell & Ainsworth (1974, p. 143) propose that maternal responsiveness fosters development of communication and fosters the child's self-confidence for his executing actions and controlling what happens to him to a limited degree.

Effects from Reciprocal Interaction

The Early Environment

Traditionally, there has been a rigid conceptual separation of the organism and the environment as two distinctly closed systems. Traditionally, environmental influences have been analyzed in a unidirectional model, that is the focus was on the child to respond in a fairly straight-line recipient role (Yarrow, 1968, p. 16; Kessen, 1974, pp. 12-19).

Yarrow (1968) has remarked on an emerging mode for viewing the organism and the environment. There now appears to be a recognition of the interdependence of organism and environmental forces on a number of levels. With this recognition comes the understanding of an interactional framework in which continual bidirectional interchanges occur and in which there is no simple antecedent-consequent relationship of events. The infant responding to and eliciting responses in reciprocal interactions operates on three major aspects of the environment--the inanimate environment, the human environment, and conditions under which stimuli from the former two are provided.

The Inanimate Environment

Yarrow, Rubenstein, Pedersen, & Jankowski (1973, pp. 967-979) have attempted to analyze the inanimate environment along three dimensions--variety, responsiveness, and complexity. Variety refers to a measurement of the quantity of different objects in the infant's reach. Responsiveness relates to the feedback potential inherent in the objects and may be measured in terms of change wrought in the visual, auditory, and tactile

properties as a result of the infant's behavior. Complexity seems parallel to multi-sensory in the qualitative extent to which objects provide information through various modalities. Criteria for judging complexity in an object would include variety of colors, different shapes, and variations in contour, amount of visual and tactile patterning, and degree of responsiveness of the object.

These three dimensional indices may be used to gauge stimulation from objects and events and stimulation from the general environmental context (Yarrow, 1968, p. 17). Three especially important effects of the stimuli properties on the young infant that Yarrow (1968), Murphy (1968b), and Brackbill (1973) reported were the arousal effect, the effect of directing and focusing of attention on the external environment, and the effect of producing active approach or avoidance responses.

Conditions in the inanimate environment are determined (Yarrow, 1968, p. 19) by the nature of the properties in the stimuli, by contingency relationships involved, and by the interaction between specific stimulus events and the impact of cumulative experiences that may have affected response patterns.

More specifically, one may evaluate functional attributes that color the conditions of the inanimate, as well as the human, environment and note whether the conditions evoke responses, facilitate expression of particular types of behavior, inhibit expression of particular types of behavior patterns, sustain given levels or kinds of responses, reinforce or increase the probable reoccurrence of certain kinds of responses, and decrease certain kinds of responses.

Examples of particular conditions in the inanimate environment that possess certain of these functional attributes may be found in the conditions of familiarity versus unfamiliarity of setting (Corter, Rheingold, & Eckerman, 1972), institutionalization (Robinson & Robinson, 1965), social class attitudes and practices (Streissguth & Bee, 1972), internally set time limits for involvement (Corter, Rheingold, & Eckerman, 1972), and sensory stimulation-deprivation (Robinson & Robinson, 1965; Murphy, 1973; Spitz & Wolf, 1973).

The Human Environment

Yarrow (1968, p. 19) enumerated six variables distinctive to the human environment: affect characteristics of reciprocal interaction, level or depth of relationship established between infant and caretaker and significant persons, extent of individualized sensitivity to child, behavior and personal characteristics of the identification models (caretakers and peers), consistency and predictability of caretaker's behavior, and continuity of significant persons.

In addition to evaluating along the variables outlined above, the human environment can also be evaluated along four dimensions of stimulation of amount, intensity, variety, and complexity (Yarrow, 1968, p. 19).

The Caretaker

Nurturer, Protector, Stimulator

Inherent in the caretaker role are certain implications for adult need fulfillment and for adult ego escalation. Of functional importance to the infant are the caretaker's primary roles as nurturer, protector, and stimulus agent (Murphy, 1968b, p.77).

Provence (1968, pp. 28-36) looked at both the biological and social components of the caretaker-child relationship and somewhat equated the infant environment with the quantity and quality of maternal care. It was within that maternal care that sensorimotor experiences and social and affective communication began. A belief that Provence (1968, p. 36) projected (and that was not presented elsewhere in the survey of infant development literature) was that the verbal communications of adults give "essential elements in development, differentiation, and organization of the infant's inner world of thought, imagery, and emotions." In addition to providing symbolic information and explanations verbally, the caretaker extends his teaching role to an alter ego role for the infant and interprets and reacts nonverbally for the infant (Provence, 1968, p. 36).

Besides the caretaker's activities oriented toward physical nurturing and providing stimulation for the infant, Provence (1968, p. 30) expressed that the most basic infant need was for a person who would serve as an interactive social partner. This person would be someone who would respond to the infant's distress signals and would comfort and help relieve the infant's tension. Through the formation with an interactive social partner of a primary attachment relationship in the first year of infancy,

the infant is assisted developmentally to relate to mother substitutes. The affectional relationship of the infant and active social partner Provence referred to is viewed as significant by Yarrow also, especially with reference to the inanimate environment. Yarrow (1968, p. 21) felt it probably true that the child's capacity to respond to inanimate stimulation is significantly influenced by a broader context of affectional relationships.

Yarrow (1968, p. 20) and Murphy (1968b, p. 79) focused heavily on the stimulus-source role of the caretaker. They viewed the caretaker's activities as central to initiating stimulation, mediating stimulation, and serving as an agent of response.

In initiating stimulation, the caretaker provides stimulation of two general types, stimulation of a physical contact with the caretaker's body and other evocative stimulation to elicit responses from the infant. The physical contact stimulation, provided fairly intensively from birth to three years of age, is useful to arouse the infant for an awareness of and responsiveness of the environment, to possibly serve a primitive need-gratification, and to reduce tension in the infant.

The other evocative stimulation, provided through direct and indirect teaching approaches becomes more important than physical contact with increasing age. The caretaker supplies materials, objects, and experiential opportunities for eliciting infant responses. As a facilitator the caretaker creates and manipulates situations to elicit personal-social responses.

In mediating stimulation the caretaker acts to bring the infant in contact with appropriate stimuli, determining the context of events, and serving

as a source of gratification and frustration.

Murphy (1968b, p. 77) spoke to the point of appropriate stimulation and the infant's need for protection from an overwhelming amount of external stimulation that overarouses, yet provision for an adequate amount for the individual. There must be, she indicated, a balanced respect for stimulation and for the baby's autonomy and his learning to adapt in his own individual way.

Provence (1968, p. 37) was in agreement with Yarrow's latter point when she proposed, "The baby's relationships to others are also permanently colored by the fact that the essential role of those he loves includes experiences which frustrate him . . . [and] give him pleasure. His most intense feelings, . . . positive and negative, are attached to those who are closest to him."

In serving as agent of response, the caretaker responds selectively to the child rather than simply doing things for him (Yarrow, 1968, p. 20). This point is unquestionably the strongest for assisting the child in his development of reciprocal relationships with people.

Inadequate Caretaking

The impact of inadequate caretaking in nurturing, protecting, and stimulating functions is greatly felt in caretaker-infant interactions. For this discussion the effects of inadequate caretaking concentrates on quality of care and emotional involvement, immediate impact of separation from caretaker, loss of a love object, discontinuity in caretaking figures, and reduction in sensory stimulation.

The quality of care and emotional involvement the caretaker invests is perhaps interpreted as nurturance by the infant. Provence (1968, p. 37) has stated, "One can be fairly confident that the infant can correctly interpret observations of his feelings, preferences, and dependency upon others." The infant's dependence on an interactive social partner to respond to him and for him is likely to be affected by a change in a a mother figure, but Yarrow & Goodwin (1973, p. 1040) did not see such a change as traumatic if the quality of maternal care and emotional involvement were poor or inadequate before. Wenar (1972) failed to observe either executive competence or spontaneous social behavior in one-year-olds as related specifically to quality of maternal care. He did suggest that social and physical learning take place in very different affective contexts.

Yarrow & Goodwin (1973, pp. 1032-1040) investigated the immediate impact of separation from an original caretaker and reaction to changes in caretakers. The investigators found a wide range of reactions among the infants so affected and few infants who exhibited severe reactions when compared to those noted in institutional studies. There were behavioral changes that Yarrow & Goodwin categorized by disturbances in social behavior, disturbances in affect, loss in developmental functioning, disturbances in adjustment to routine, and disturbances in physiological functions.

Those disturbances in social behavior were characterized by apathy and exaggerated stranger anxiety. Disturbances in relationships with the new mother figure were expressed in feeding problems, restless sleep patterns,

and in physiological irritations, such as colic and digestion upsets. Also infants under six months of age exhibited excessive clinging to the new mother figure, but infants over six months tended to reject her. Yarrow & Goodwin (1973, p. 1034) stressed the impact, "that the rejecting type of reaction on the part of the infant . . . may trigger off disturbed mother-infant interactions that set the tone for later relationships."

Disturbances in affect were spread over a wide range in both variety and degree, namely from increased overt expression to apathy and lack of appropriate affect. Withdrawn behaviors, defenses against disturbing environmental conditions, included the infant's tending to sleep more, to cry constantly, and to take on stupor-like postures. With increase in age at the time of change in the mother figure, there was an increasingly severe type of response, observed particularly in the seven to nine month age group. This observation was in keeping with that of Spitz and Wolf (1973).

Disturbances in developmental functioning, interpreted through individual cases, seemed to align with those functions vulnerable to stress and those functions varied from one individual infant to another. Some infants exhibited gross motor regression, others exhibited fine motor coordination regression, and still others exhibited personal-social regression. There did appear to be a tendency for most recently acquired functions to be lost first.

Disturbances in adjustment to routines were exhibited by the infant's generalized deterioration, by unusual sleep patterns, and by eating patterns that ranged from the lack of appetite to voracious appetite.

Yarrow & Goodwin's (1973, p. 1037) findings of these five categorical behavior disturbances seemed age-related. Although a small number of infants indicated disturbances as early as three months, there generally was a concentration in the number disturbed and in severity of disturbances between three and six months of age. Fifty percent of infants of age five months who were placed with new mother figures exhibited signs of disturbance, and 86% of those infants six months of age so placed exhibited disturbances. Infants of seven to sixteen months of age presented clear evidence of disturbance, which Yarrow viewed as a result of the interruption of a focused relationship (Yarrow & Goodwin, 1973, p. 1039).

Murphy (1968b, p. 81) viewed the infant's intense sensitivity to brief separation from the mother as expressing itself in shyness, resistant behaviors, and management conflicts. Reasons for the infant's tendency to be easily disturbed from one to two years of age may be the sense of imbalance from the infant's developing new capacities, the changing opportunities, and the infant's awareness of these without knowledge of how to operate in the overwhelming milieu. With this set and separation from an original caretaker, one may more fully appreciate the basis for disturbed reciprocal interactions.

It appears there is a critical period for separation from the original caretaker and that a separation during this period may precipitate maldevelopment for the infant in early reciprocal interactions. Spitz & Wolf (1973) would respond to this event as a possible factor in the genesis of psychiatric conditions in early childhood.

In Spitz & Wolf's (1973, pp. 1015-1022) study of disturbed nursery infants deprived of a love object for an appreciable period in the first year, the symptoms of anaclitic depression manifested themselves in ways similar to those described by Yarrow & Goodwin (1973). Manifestations included apprehension, sadness, weepiness, lack of contact, rejection of the environment, withdrawal, retardation of development and retardation of reaction to stimuli, slow movement, dejection, stupor, appetite loss, refusal to eat, loss of weight, insomnia, and depressed physiognomic expression.

The factor that appeared the source of the varied manifestations was the removal of the mother figure for a practically unbroken period of three months during the sixth to eighth month interval of life. During the three month interval the infant either did not see the mother figure at all, or at best saw her once a week. Generally, the syndrome manifested itself within four to six weeks following the mother's removal. Upon the mother's return the infants made tremendous gains in personal mental balance, and developmental quotients reflected appreciable gains, often beyond the actual age of the infants.

Yarrow (1963, p. 22) has written of the harmful effects of discontinuity in maternal care on the psychological development of the infant. Studies of young infants placed in institutions after separation from a mother figure have given evidence of the effects of discontinuity. Besides viewing discontinuity of the person who was chief source of gratification for the infant, discontinuity can be viewed in quality of patterns of stimulation and gratification, in timing and scheduling of experiences, and in a broad background of environmental context.

Greenberg (1971, p. 417) has concluded that "atypical behavior and atypical development can be induced and maintained by quality of stimulation." Insufficient, faulty, or extreme patterns of stimulation as well as reduction in sensory stimulation may result in inadequate maternal care for the infant (Robinson & Robinson, 1965, p. 187) as described in case studies of 'attic children' who have been reared in abnormal ways and who have received minimal stimulation and minimal contact with humans. Such children exhibited retardation in overall development, retardation of reaction to stimuli, fearful and withdrawal postures, and aged and depressed physiognomic expressions.

Murphy's (1968a, p. 123) concern for the protection of the infant from personality defects was voiced in her plea for the establishing or finding of a level for qualitative and quantitative stimulation that would lead "to interaction with adults or other children and thus to integrative development, communication, and active experiencing and mastery of the environment".

Cultural and Maternal Influences

Although much has been written about the need for adequate maternal caretaking and its effects, Greenberg & Hurley (1971, p. 129) reported limited documentation exists for understanding how parental factors, especially maternal personality and behavior, influence growth and development of infants. Greenberg (1971, p. 393) has stated that a critique of the research on parent-child interrelationships and infant-mother interaction will reveal that several broad assumptions, not empirical proofs, underlie this area of research.

The assumptions are that environment influences mental, social, and emotional development; that essential environmental factors affecting such development are found in parents' behaviors and personalities; and that parental influences are inordinate during these earliest years of infancy and may produce significant lasting changes in a positive or a negative fashion.

Rebelsky (1974) suggested that, from her cross-cultural study, differences in early environmental influences on the infant are probably due, in actuality, to cultural differences, attitudes, and practices. Goldberg's (1974, p. 206) study of infant care and growth in Zambia reinforced the Greenberg (1971) and Greenberg & Hurley (1971) observations above. Goldberg not only recognized the limited documentation in caretaker-infant interaction studies but also the inadequacy of our comprehending the complex factors which influence development.

Subcultural attitudes and practices (Tulkin & Cohler, 1973; Tulkin & Kagan, 1972) were seen as important factors that impinged on the caretaker-infant interaction. A typical working class mother's attitude expressed about interaction with the infant was that it seemed futile to attempt to interact until the infant had begun to talk, as she could influence the infant's development very little (Tulkin & Kagan, 1972). Tulkin & Cohler (1973) critiqued attitudes of middle class mothers and found that in comparison to working class mothers, there was reflected more appropriate control of aggressive impulses, greater encouragement of reciprocity, acceptance of emotional complexities in childrearing, and comfort in perceiving and meeting the baby's needs. Correlations between attitudes and actual be-

haviors were fairly parallel and reflected reciprocal interaction verbally and n verbally.

Streissguth & Bee (1972, pp. 171-172) reported on the subcultural and class effects of educational level on mother-infant interactions in a free play and a teaching session. Significant differences were apparent in the mothers' activity levels, use of reinforcement, and feedback procedures. "All mothers were much more active with their infants in the teaching situation than in free play, apparently perceiving the teaching situation as requiring more active intervention" (Streissguth & Bee, 1972, p. 172). Mothers with lower education levels used more negative statements of disapproval and criticism in free play and in teaching sessions than more highly educated mothers. The higher education group of mothers used four times as much positive as negative reinforcement in teaching and the same amount of positive reinforcement in free play as the lower education groups of mothers used. These maternal behaviors were stable over the three month age intervals observed at 9, 12, 15, and 18 months.

In addition to cultural differences and sulcultural attitudes and practices that shape various forms of maternal caregiving, Greenberg & Hurley (1971, p. 130) identified another variable that bears strongly on caretaker-infant interaction. It is the background and personality of the caretaker and particularly his levels of perception and responsiveness that affect caregiving and nurturance for the infant (Broussard & Hartner, 1971; Greenberg, 1971; Greenberg & Hurley, 1971). The impact of this latter variable provoked Greenberg & Hurley's (1971, pp. 130-131) assumption "that a favorable mother-child relationship involves mutual satisfac-

tion and pleasure and that the mother's capacity to recognize and evaluate the needs of her own child and her ability to achieve gratification within her own unique personality pattern influence the development of adequate maternal behavior."

Greenberg & Hurley (1971) and Broussard & Hartner (1971) wanted to know more about how maternal perception operated and how that perception could possibly affect infant development. This interest led to the former investigators' devising an objective instrument for assessing personality attributes in relation to maternal behaviors and infant development. Greenberg & Hurley (1971, p. 131) viewed the making of psychological assessments of this sort of the mother during pregnancy as a possible predictor of future maternal behavior. One value of using such a procedure could be reflected in support systems made available for the post-partum mother (Broussard & Hartner, 1971, p. 441).

From their longitudinal study, Broussard & Hartner (1971, pp. 440-441) learned by means of attitudinal and perception inventories that the mother's positiveness and optimism about her infant and herself were of major importance in the early development of healthy interactional patterns with the infant. From evidence of maternal perception of first-born children, it seemed the mother's perceptions were based much on fantasy, on reflections of herself, or on some identity with an outside factor. The maternal perception of the month old first born was related to the infant's subsequent development in the lower appearance of psychopathology at age four and one-half years among children viewed as better than average at one month than among children not so viewed.

A true predictive maternal perception seemed to come after a real, living-with-infant experience. "The outcome of the child's development and ability to master the successive life tasks may be dependent for a large part on the mother's positive hopefulness . . ." (Broussard & Hartner, 1971, p. 440), which sets in motion a positive response pattern for future interactions.

In the preceding pages the focus has been on the human, or social environment, and those variables distinctive to it and the dimensional aspects for describing the human stimulation. The centrality of the caretaker role, especially in nurturance, protection, and stimulation functions for the infant were examined and evidence cited for the effects of inadequate caretaking. Particular determinants of caretaker-infant interactions were identified relative to cultural and subcultural factors, maternal attitudes and personality, and maternal perception and responsiveness.

The Infant

In an attempt to expand the description of particular dimensions of early stimulation, Yarrow et al. (1973, p. 971) identified six infant variables that are affected by or affect early reciprocal interaction. These variables included the infant's social responsiveness, language, fine motor, gross motor, problem solving, and cognitive-motivational functions. The social responsiveness variable and its relevancy to the psychological development of the infant will be focused on in this section.

Social Responsiveness

In Murphy's (1968a, p. 121) reference to those factors that affected institutional infants in their ability to thrive, one major factor was the infant's ability to elicit caretaker responses. This factor is vital for the non-institutional infant as well. Moss has stated (Murphy, 1968a, p. 121) that "the infant at home 'shapes' the mother or caretaker to respond appropriately to him by his smiles and by his distress." As shaper and conditioner, the infant can supply positive reinforcing stimuli to control a variety of environmental behaviors and aversive reinforcing stimuli that create reinforcement for aversive caretaking action (Gewirtz, 1968, p. 197).

The infant's social responsiveness to the caretaker is more often accompanied by affect than the infant's exploration of the physical environment (Wenar, 1972, pp. 256-260). The affect of the social overtures by the infant tends to be characterized by number, intensity, and duration and does not tend to be related to the infant's level of executive ability. One early event characterized by a social responsiveness nature is the infant's smiling and laughing.

Smiling and laughing. Gewirtz (1973, pp. 1081-1082), in his review of the literature concerning the developmental course of smiling in the first year, reported that smiling appeared to begin with a spontaneous or reflex smiling phase, to pass through a social smiling phase, and to end in a selective social smiling phase. Spontaneous smiling, of brief duration as a phase, occurred when there was no readily identifiable stimulation about and when there was a variety of kinesthetic, tactual, or contact

stimuli. Spitz & Wolf (1973, p. 563) commented on the determination of the spontaneous smiling, or endogenous smiling, as arising out of intrinsic physiological rhythms and not particularly expressing a tensionless condition in the organism. Following the endogenous is the exogenous smiling, an irregularly noted response first elicited in wakefulness at approximately three weeks of age. The exogenous smile appears more often between three and eight weeks and becomes predictable when elicited by a visual stimulus. This parallels with Gewirtz's social smiling phase.

Social smiling, occurring between the second and eighth weeks of life, was evoked by a variety of stimuli visual in nature and social in origin, that is provided by the human face. The selective social smile phase begins before the twentieth week, at which time it peaks in occurrence to both familiar and stranger adult faces.

Horowitz (1967, pp. 27-41) reported Dennis's observation that smiling in the first 26 weeks of life will occur even if adults fail to respond to the smile and Brackbill's observation that adult social reinforcement of infants' smiles had been influential in establishing a stable level in the infants' rate of smiling. The two variables that influenced the rate of smiling were the presence of the adult figure and the ratio of reinforcement to response. The peak period for smiling by home infants was approximately the thirteenth week as compared to that by institutional infants at approximately the twentieth week. One implication made of this finding was that social responsiveness, as determined by the smiling variable, may be a function of the amount and kind of social reinforcement afforded by the environment.

Watson (1973, pp. 73-75) reported the quickest, longest, and most vigorous smiling in the first sixteen weeks occurs to the face stimulus with the face eliciting more vigorous smiling if aligned with the infant's face in a 0° orientation. Watson also reported findings from other studies of infant smiling and response-contingent stimulation. The Hunt & Uzgiris finding held that infants exhibited vigorous smiling on discovering they could establish control over their mobiles. The Ramey & Watson observation of smiling and cooing by experimental group infants on the third or fourth day of exposure to a visual hanging display was also in relation to the infants' discovery that they could effect and control the stimulus. The control groups of infants, exposed to a stabile display and to a noncontingent mobile that turned periodically, were observed to smile at a lower degree of vigor and duration than the experimental infants.

Watson (1973, pp. 83-85) believed that smiling and cooing as an indicator of social responsiveness appeared and increased in a pronounced way if the stimulus were familiar and if it were a clearly contingent stimulus. Watson felt the infant's social responsiveness rested upon the infant's perception of the contingency relationship between specific stimulus and specific response. The caretaker's or adult's responsiveness to the infant's social behavior appeared to be the important feature that led the infant to seek out the caretaker for stimulation and attachment.

Visual stimuli are of little value in eliciting smiles from blind infants. Fraiberg (1971, pp. 113-125) indicated the blind infant's utilization of auditory, tactual, and kinesthetic stimuli served him in familiar-

ization, selectivity, and negation of situational relationships.

By one month of age the blind infant manifested a smiling response to the sound of either parent but not to an outsider's voice. By two and one-half months, there was a noted increase in the blind infant's smiling and a pronounced selectivity for the mother's voice and sounds. Over the three to six month period, the most reliable stimulation for evoking smiles or laughs was gross tactile or kinesthetic stimulation, such as lap games and patty-cake touching, and these smiles were elicited only for the mother.

Particularly interesting differences in the blind infant's smiling were noted by Fraiberg (1971) in the lack of a smile to initiate or invite social contact, the less frequently seen smile as compared with sighted infants, the muted quality of the smile even in a satisfying mother-child relationship, and the emergent laughter that erupts at the peak of game excitement.

Sroufe & Wunsch (1974, pp. 339-352) indicated their data suggested laughter to be a sign of an important transaction between the infant and his environment and that this form of social responsiveness probably signaled a significant tie between cognitive development, emotional growth, and a relationship between security and exploration.

The onset of laughter, noted about the fourth month, undergoes a number of changes in amount and in the nature of stimuli that elicit it. The primarily tactual and auditory stimulation that sets off laughter in infants of less than four months loses its power and visual stimulation becomes more powerful. There was a suggestion made that with age those

stimuli requiring cognitive expertise grew more influential in eliciting laughter in infants, as observed in younger infant's laughter at the completion of a stimulus and older infants' laughter in anticipation of the termination of the stimulation.

Laughter may serve as a register of the meaningfulness of the social interaction along four conceptual dimensions--ambivalence, cognitive development, contextual role, and approach or avoidance intentions. These four conceptual dimensions indicate that the infant's social responsiveness is in a state of continual change, despite the fact that laboratory evidence usually does not reflect the chimeral aspects. As for an ambivalence interpretation of infant laughter, one would note the wavering between smiling and crying or a change from one to another within a single trial. Laughter may serve as an indicator of the infant's developing concepts and schemata as well as an indicator of how contextual dynamics (setting, agents, prior stimuli, aspects of presentation, special features) are affecting his social role. Laughter is a cue-in system for announcing the infant's interest, approachability, and avoidance feelings.

In addition to the smiling and laughing events, factor analytic studies have been made of a number of other social responsiveness variables operant in the caretaker-infant dyad (Barnett, Liederman, Grobstein, & Klaus, 1970; Birns, Blank, & Bridger, 1973; Leifer, Leiderman, Barnett, & Williams, 1974; Lewis, 1972; Moss, 1967; Moss, Robson, & Pedersen, 1969; Rheingold & Bayley, 1968; Stern, Caldwell, Hersher, Lipton, & Richmond, 1973; Turnure, 1971).

Sex, age, and state. Lewis (1972) analyzed mother-infant interactions as a function of sex. According to empirical findings (Lewis, 1972, pp. 95-

122), there appeared to be great variability among mothers and infants as to frequency of interaction and maternal differences in relating to the infant. Lewis noted that the frequency of positive maternal behavior appeared to reduce fretting and crying responses in infants. Other strong relationships between mothers and infants were observed by Lewis in maternal vocalizing related to infant vocalizing, maternal play related to infant play, maternal looking related to infant movement and noise, maternal vocalizing, holding, and looking related to infant fretting and crying, and maternal touching related to infant vocalizing and movement. The two most common type interactions to infant vocalizing was maternal vocalizing and maternal holding and looking at the infant. Mothers of male infants appeared to use fairly equal amounts of proximal (touching and holding) and distal (looking and vocalization) behaviors, and mothers of females tended to employ distal behaviors.

Lewis found that infant behaviors did not show any sex differences with reference to what the mother was doing, but that differential responsiveness to infants by the mother was colored by the infant's sex. Mothers of male infants touched, held, and rocked the males more than mothers of female infants. The latter mothers vocalized and looked at their infants more than mothers of males. Also Lewis viewed infant vocalizations as responses to behaviors initiated by the mother and maternal vocalizations as responses to vocalization initiated by the infant. One implication to be made is that frequency of mother-infant interactions and differential responsiveness to infants are results of sex differences.

Moss (1967) studied mother-infant interaction on the bais of three variables--sex, age, and state of infants. State was defined as arousal level that affected quality and quantity of maternal behavior. As in the Lewis (1972) study, a striking variability was noted in infant and maternal relating. The sex variable was noted in maternal responses and was reported to be greater in impact at three weeks than at three months, especially for males who slept less and cried more than females during both time intervals.

The age variable was perceived as a determinant in the behavioral response shift in mothers and infants when the infant was three weeks old and three months old. Maternal behaviors toward the three week old consisted of holding the infant closely and feeding and at three months, attending to infant with affectionate contacts, stimulating arousing behaviors, and talking to infant. For the infant at these two age intervals, behaviors had shifted from crying, irritable and sleeping responses to visual focusing on the mother, vocalizing, and mouthing.

The state, or arousal level, variable was observed to be an initial control device of the infant's, with the diminishing of such control as the mother gained in reinforcement value. However, the infant's cry still appeared as the most possible determinant of maternal behavior.

Maternal style characteristics. Another factor analytic study concerned with determinants of maternal stimulation of infants examined styles in mothering. Moss, Robson, & Pedersen (1969, pp. 239-246) sought to determine if stylistic characteristics of the mother were associated with the amount and type of stimulation expressed toward the infant at one and three

months of age and if the type of stimulation was related to degree of infant fearfulness of strangers at eight and nine and one-half months.

It appeared that style characteristics the mother exhibited (talking to infant, kissing, and rocking in chair reflected a social and affectionate nature and afforded soothing for the infant. The amounts of auditory and visual stimulation provided infants at three months seemed significantly related to less fearfulness of strangers at eight and nine and one-half months.

The mother's voice seemed to be a powerful variable for eliciting infant responses and for providing information about the nature of the infant's schema of mother. In Turnure's (1971, pp. 182-190) study, it appeared that female infant responses to the distortion-of-mother's-voice and to normal voice-of-mother tapes at three months and nine months were of greater activity and more absolute limb movements than seen in male infant responses. The frowning, mouthing, and vocalizing all babies presented at three months to all auditory samples of mother's voice and stranger's voice may suggest the infant's awareness of external stimuli that have had some experiential value for them. The infants' crying during all stimuli at six months may suggest that they were using the greatest demand and control device to respond to external stimuli that had acquired emotional values. By nine months of age, there was a tendency for babies to exhibit greater motor quieting for all auditory tape samples, indicative perhaps of the infant's growing attentiveness for verbal stimulation, especially for the mother's voice.

Individual infant differences. The mother's voice has been considered a soothing device by some investigators. Birns, Blank, & Bridger (1973, pp. 295-300) were curious about the effectiveness of various soothing techniques on the human neonate, the individual neonate's susceptibility to various soothing agents, and the comparable ability of individual neonates for differential responsiveness to soothing as to excitatory stimuli.

The investigators employed four specific soothing stimuli--a low frequency pure tone at an 85 decibel level presentation three feet from the infant's head, a sweetened pacifier, gentle rocking, and immersion of the infant's foot in 108° F. water--and a nonstimulus control period. The results reported were that there were differential effects of the various soothing stimuli, none of which was more effective than any one of the four specific stimuli, but all were more effective than the control. There did appear to be individual differences in susceptibility to specific agents as well as differences in general ability to be soothed. Birns et al. made the implication that these latter two traits in individuality and ability may be important in influencing mother-infant interactions.

The experimental mothering experiment (Rheingold & Bayley, 1968, pp. 156-163) employed with a small group of institutional infants clarified the impact in reciprocal interactions of an experimental mother's providing much attentive care in the six to eight month age interval. The immediate result from the two month intense experiment was that the experimental group of infants was more socially responsive than the control group. The one-year-later result of the experiment showed no statistically significant differences existed between the groups except for greater vocalizing in social tests by the experimental group of infants.

Early neonatal separation. Barnett, Liederman, Grobstein, & Klaus (1970) and Leifer, Liederman, Barnett, & Williams (1974) presented studies concerning the impact on the mother of neonatal separation and early infant separation. Barnett et al. (1970, pp. 197-205) looked at the effects of interactional deprivation in the neonatal period on maternal attitudes and behaviors. Three variables most affected by the separation were the timing and duration of contact, the sensory modalities of interaction, and the nature of caretaking in interaction.

The mothers who experienced interactional deprivation presented differences behaviorally in their sense of commitment to theinfant, their levels of self confidence to mother, and their use of stimulation and caretaking skills. It was noted that when both parents were prohibited from entering the premature nursery, the father later tended to be more involved in the infant care than those fathers whose wives were permitted in the nursery to care for their infant.

Leifer et al. (1974, pp. 116-128) also examined the impact on the mother of interactional deprivation in the neonatal period up to 12 weeks for possible implications to be made about maternal attachment behavior. Maternal attachment behavior was defined to mean the degree to which a mother was attentive to and maintained physical contact with her infant.

Two groups of mothers of premature infants and one group of mothers of full term infants were compared for attachment behaviors. There were no differences in attachment behaviors reported between the two groups who bore premature infants and who were separated by the infants' three to twelve week hospitalization, even though one group of mothers had aperiodic, almost

full sensory contact with their infants and the other group of mothers had only visual contact. The third group of mothers who had had periodic full contact during the two to three day hospitalization exhibited more attachment behaviors (smiling at the babies and holding them close to their bodies) than the groups of mothers with premature infants.

Attachment behavior would seem to be one of the variables that promote maternal caretaking of and attraction to the human infant, although Leifer et al. (1974) indicated such variables have not been clarified. The key finding of this study seemed to underscore the early separation variable and to suggest that it may seriously disrupt normal maternal and marital behaviors and thus, affect the psychological development of the infant as well. Disruptions in marital behaviors were noted in that two of the mothers separated from their infants chose to give up the infants and five of the mothers separated from their infants divorced.

The factors that surfaced in this study and which appeared to facilitate maternal attachment behaviors concentrated around the separation term, the differences among mothers in their hormonal and physiological states, the characteristics of the infants, the differences in mothers' statuses at birth, the cognitive and affective experiences during separation, the post-birth time of first contact between mother and infant, and the types of contact between mother and infant available during separation.

Barnett's et al. (1970) study had been a pilot investigation to determine the feasibility of altering premature care procedures. Leifer's et al. (1974) investigation gave support for the altering with the above indications for facilitating maternal attachment in addition to the suggestion

that the mother's hormonal condition when she first contacts the infant or assumes full responsibility influences the quality of the maternal attachment.

The impact on the mother of early interactional deprivation due to separation from the infant and the impoverishment of maternal attachment behaviors is a focus not normally as greatly highlighted as the impact on the infant from these two sources of stimulation. In the next section the focus will be on the meaning of attachment and separation processes for the infant.

Attachment. Robinson & Robinson (1965, p. 190) credited Schaffer with the postulation of a three-stage progression in the development of attachments by infants for other human beings. The first stage speaks to the infant's needs for sensory stimulation of the sense organs, for movement, and for change. The second stage concerns the infant's need for human stimulation, and the third stage, beginning about the sixth to eighth month of the first year, relates to the development of a special attachment for a single person or a few significant persons.

Murphy (1968b, p. 79) pointed to the centrality of the mother figure for the six to fifteen month infant, probably his first attachment who affords him safety, provides for physical integration, and develops his sense of self-identity with the mother figure.

The origin of and causes for the attachment process have been reviewed by Ainsworth (1969), Yarrow (1967), and Yarrow & Pedersen (1972) with references to terms such as object relationship, dependence, attachment, and focused relationship. The clarification of these terms seems

appropriate at this time, for in review of the literature one notes investigators reporting from psychoanalytic, social learning, and ethological orientations. Yarrow & Pedersen (1972, pp. 55-56) and Ainsworth (1969, pp. 969-1025) stressed that theoretical differences which gave rise to different terms lay in the points about the origin of the focused relationship, the relative role of instinctive and environmental factors that produce mother-infant relationships, and the mechanisms involved in strengthening those relationships.

First, the psychoanalytic term object relationship is based on the concept of the caretaker, a differentiated element in the environment associated with gratification for the infant's needs, becoming the love-object. It is through the love-object's granting gratification and frustration of basic instinctual needs that the infant develops an awareness of the external environment and strong dependency on the love-object.

Second, the social learning term dependency as promoted by Sears refers to the reduction of primary drives in the infant and the association with the mother's presence in attending to primary drive reduction. The infant thus develops the motive for keeping the mother figure near. Cairns saw the mother figure's continual presence to be a reinforcer for the infant's associated responses and the infant's proximity to the mother as a reinforcer on the mother's responses.

Third, the two terms attachment and focused relationship are derived from ethological theorist John Bowlby. The ethological theory maintains there are species-specific behaviors that initiate the process of attachment and develop discriminative affectional ties. The process of attach-

ment may occur at all ages and tends to endure, although the behaviors will vary. The infant's attachment behaviors serve him in an adaptive way in this process for survival while acting as releasers of nurturant responses by the mother.

Yarrow & Pedersen (1972, pp. 56-59) have identified five steps in the development of focused, or attachment, relationships within the context of the infant's perceptual, cognitive, and social development. These steps include the establishment of boundaries between self and external environment, the discrimination between people and inanimate objects, the discrimination of a mother or familiar caretaker, the development of specific expectations of a mother, and the development of trust or confidence in a mother as a source of gratification. The five steps follow an orderly sequence, each step surfacing in part-development and over time becoming more refined, differentiated, and functionally precise.

Beginning at the third step, the discrimination between familiar and unfamiliar people, there is an initial indiscriminate, social responsiveness developed by persons' smiles and vocalizations serving to elicit and reinforce the infant's social response. Next, there is an emerging differential responsiveness to the mother or other persons as the infant responds to distinctive cueing systems of the individuals. The cues noticed by the infant are properties of stimulation--visual, auditory, tactile, and kinesthetic--that develop primitive concepts of personage for the infant. The selective responsiveness, first noted in recognition of the mother, is indicated by 38% of one month olds and by 100% of five month olds. Later, active preference for mother over stranger is noted in the behaviors of 66% of five month olds.

Through repeated exposures to the behavioral and contextural associations with the mother or other significant persons, the infant develops an elaborate, differentiated, and more coherent picture of the caretaker. Based on this developmental picture, the infant signals in his behavior the expectation of certain responses from the caretaker (step four). The emergence of the expectation stage may reflect the establishment of a rudimentary memory process, the infant's cognitive capacity to respond differentially to mother and to strangers, and the cognitive capacity to understand object permanence.

In the highest level of the focused relationship is the confidence stage (step five). Yarrow (1968) noted that the confidence stage is first indicated by the infant's expecting soothing when in distress and that approximately 50% of three month olds exhibit confidence in the mother to attend their needs. A later indicator of this confidence is noted in the ability of the infant to wait for maternal gratification.

Based on supportive evidence, Yarrow & Pedersen (1972, p. 63) proposed that attachment is fostered by the availability of someone who has a distinctive relationship with the infant, who is contingently responsive to the infant's signals, and who engages the infant in stimulating interactions. The infant and his characteristic behaviors apparently affect the attachment process, but the research at hand concerning this is contradictory and inconclusive, say Yarrow & Pedersen (1972, p. 64). According to these investigators, two clusters of infant characteristics probably affect the attachment process. These are the temperamental match (as to activity level and modality preferences) and sexual characteristics.

The interrelations in attachment behaviors of human infants studied by Coates, Anderson, & Hartup (1972) were noted to correlate and establish a pattern of attachment. Significant correlations existed between visual regard of the mother and the infant's touching and maintaining proximity to her. The infants who vocalized to their mothers did not necessarily seek out physical contact but probably interacted with considerable visual regard. There were positive correlations reported between touching and proximity before mother's separation and crying by infant during separation.

Ainsworth, Bell, & Stayton's (1972, pp. 123-144) investigation of the development of three classes of attachment behavior, crying, responding to mother's exits from and entry to the room, and physical contact behaviors highlighted the individual differences among infants in this development. Some infants whose mothers ignored their cries or delayed responses to the cries, cried more often and/or for longer periods as compared to infants whose mothers responded promptly. Large differences in duration of crying existed during the first quarter of the first year, ranging from 0 to 21 minutes of crying per waking hour. Crying was usually terminated by some physical contact but doing any attention-giving to the infant helped to diminish the crying.

Crying was the infant's response to the brief everyday separations by the mother, with peak periods of crying at 33 and 45 weeks. (Fleener & Cairns (1970, pp. 215-223) had reported also crying of a vigorous sort persisting during maternal separation and this was especially for infants of one year of age or greater.) Ainsworth et al. (1972) suggested the

periods of peak crying might be in keeping with developmental discrimination of the mother, the firming up of a confidence relationship, and the interval between the periods when locomotor skills have given the infant new pleasures and discoveries.

The physical contact behaviors (viewed as attachment behaviors) included response to being picked up and put down and initiation of and cessation of contact. Mothers who held their infants for a long time in non-routine situations, but picked them up less often, appeared to have infants with positive and active attachment behaviors. Infants who were picked up often and held briefly during the first quarter usually were those infants who cried in the last quarter of the first year on being put down. Initial physical contact between mother and infant was seen to decrease over time, going from a mean of 21 minutes per hour to about six minutes per hour, from first to fourth quarters of the first year.

Separation anxiety and stranger anxiety. Tennes & Lampl (1966, pp. 426-437) looked at separation anxiety, another form of attachment behavior response produced by the infant on removal of an attached person. The primary finding of the Tennes & Lampl study was that infants expressed positive behaviors toward their mothers before they expressed distress and that not all infants expressed the distress. The infant's protest at separation from the mother (Yarrow & Pedersen, 1972, p. 59) indicated the positive value for the infant of the attachment and his potential fear of strangers.

Ainsworth & Bell (1970, pp. 49-67) wrote about the depressed exploratory behaviors that infants manifested on entry or presence of the stranger

and on the mother's absence from the immediate site. Crying was another social response to the stranger's return and certain attachment behaviors were strongly activated in situations that the infant perceived as strange or threatening. There is a fine line between the ending of separation anxiety and the beginning of stranger anxiety. Outside the time frame of separation anxiety observed around the attachment process and attached person that generally surfaces from six to twelve months, there are early cues of anxiety in infant responses to stranger approach, strange setting, the novel, and the unfamiliar.

Fraiberg's (1971, pp. 118-125) review of infant reactions to the strange and the stranger revealed Benjamin's terminology of 'stranger anxiety proper' which is related to sudden movement, loud voicing, startle reactions elicited by the unfamiliar, and postural manners of holding. Other negative stranger reactions referred to included sobering, head averting, and distressed crying.

Yarrow (Yarrow & Pederson, 1972, p. 60) reported his earlier research had identified a gradual differentiation in infant response to mother and stranger from three months of age. The infant's three month indications of his rudimentary discrimination between the mother and the stranger were exhibited by an intense visual concentration on the stranger and the ignoring of the stranger and concentrating on the mother. At five months, the infant indicated his overt discomfort with the stranger's presence through responses of crying, frowning, and physical withdrawal. The eighth month reaction to the stranger's presence was of strong negative behavior.

Fraiberg (1971) reported the blind infant, at approximately five months, used his fingers to explore faces and discriminate mother and unfamiliar persons. Differences in the infant's responses, his participation, and his registering of interest or pleasure were visibly present in his discernment of a familiar over an unfamiliar face. The blind infant reacted negatively to strangers and to strangerness as perceived in voice, touch, or holding. During the first six months, the blind infant attended to the stranger's voice with no negative reactions. From six to thirteen months, the blind infant manifested a quieting response in which activity was stopped and the quality and quantity of infant vocalizations were affected. The blind infant's response to being held was noted in whimpering, crying, screaming, motor resistance to and avoidance of the unfamiliar persons, and active seeking of the mother.

The infant's fear of visual novelty (Bronson, 1973, pp. 1258-1265) was noted to emerge near the end of the first year of infancy and to differ as a function of sex. Among male infants, the precocious development of fear of strangeness proved continually predictive of heightened fearfulness from infancy into early childhood years. Female infants who had cried significantly more from diverse causes in the first three months manifested fear of the novel at an early age of four to six months. Bronson remarked that crying at the novel seemed related to early heightened sensitivity.

Moss et al. (1969) suggested that the more accustomed to novel stimulation the infant became, the greater his ability to cope with the strange in a social context. Watson (1973, p. 83) reported that the infant's social responsiveness appeared to be shaped by the nature of stimulation. That is,

if stimulation was an indeterminate or ambiguous form, it became less positive and began eliciting negative emotional responses from the infant.

Separation anxiety and stranger anxiety are highly variable at all ages of infancy. Yarrow & Pedersen (1972, pp. 60-61) have supplied some probable factors related to the infant's responsiveness to separation anxiety. Possible explanations for infant separation anxiety included the discrepancy in differentiated expectations of the mother, the presentation of new and different sets of patterns of stimulation and response, the new environment, the new caretaker, and the degree to which the infant's past schemas are violated. In addition to these plausible explanations, other factors related to responsiveness and intenseness of stranger anxiety included the state of the infant, the impact of the immediate environmental conditions, and the individual differences in infant modes of expression.

Detachment. The response patterns noted before, during, and after separation have sometimes been analyzed for depth and stability of the attachment relationship between mother and infant. One form of separation the infant initiates is referred to as detachment (Rheingold & Eckerman, 1974). The process of detachment is viewed as co-developing with attachment and coexisting over the individual's life span.

Rheingold & Eckerman (1974, pp 149-161) remarked on the biological and psychological value the detachment process has for the individual. Biologically, detachment behaviors might be viewed as an adaptation to the environment achieved on an individual basis. Psychologically, detachment seems to provide a separation from the mother in order for the individual to interact with physical and social environments.

The detachment form of separation is characterized by the infant's explorative behaviors and attraction to novelty, complexity, and change (Rheingold & Eckerman, 1974, pp. 150-151). Perhaps these characteristics explain the institutional infants' (Horowitz, 1967) exhibition of more social responsiveness to strangers than home-reared infants exhibited. Detachment is also characterized by lack of anxiety and is not a negation of the attachment to the mother (Rheingold & Eckerman, 1974, p. 159).

Rheingold & Eckerman's (1974) study of those environmental properties which led ten month olds away from their mother shed more light on the subjects of attachment and detachment as coexisting forces. The infants were observed in relation to location of mother and infant in a two-room arrangement, to presence or absence of toys, and to varied placement of toys.

The results indicated that all infants left their mothers and entered the new room but used their mothers as a home base and security pad. The distal visual regard of the mothers on periodic returns was the infants' way of maintaining orientation with the old and the new physical and social environments. The infants' initial leaving or separation from the mother was apparently influenced by the number, variety, and location of stimulating objects and to whether the objects were part of the new environment or added later. Rheingold and Eckerman proposed the visual properties of both social and non-social objects controlled the infant's leaving, the amount of time required for the infant to leave, the distance he went, and the infant's removal from the mother's sight. Other feedback properties

in the objects apparently determined the duration of contact, the nature and extent of manipulation, the time spent away from the mother, and the child's subsequent return to the objects.

Summary

The emergent view of the infant holds that the infant is highly individualistic, especially competent, quite adaptive, and very active as an agent and a recipient in reciprocal interactions with caretaker and environment. Through her nurturing, protecting, and stimulating functions, the caretaker assists the infant in biological-maturational and social learning processes. Variables that impinge on the caretaker and infant in these processes and influence their behavioral responses in reciprocal interaction have been presented with focus on the infant's psychological development.

Two general criticisms may be made about the research work in the area of infant psychological development. First, there is the need to improve research methodologies and secondly, there is the need for more research to be done in key areas.

With reference to the first criticism, research studies of caretaker-infant interaction have supplied surprisingly positive results in spite of the conceptual and methodological problems involved. A major fault of some research studies rests in the highly subjective nature of indirect studies that are dependent on retrospective data, interview information, and questionnaire completion. Other shortcomings are noted in the lack of carefully detailed conceptualizations of variables and operational strategies, the lack of empirical terms for analyzing specific behavioral res-

ponses, and the tendency towards rating traits or attitudes rather than observed behaviors. Serious sampling problems also plague research efforts, and there is the special need for investigators to report ideas and speculations for bridging parent and infant sets of data. This speculative bridging seems necessary for developing upon tenuous, rudimentary concepts and hypotheses to greater refinement in study of infant psychological development.

Secondly, there are key areas that need much study for clarification of variables that may have been overlooked, ignored, or misinterpreted in past studies. Three areas that are especially of pertinence include cross-cultural infant development investigations, examination of infant rearing practices among subcultural and social class units and the impact these bear on infant psychological development, and investigation into maternal or caretaker attitudes and perceptions. Of the three areas, the most crucial one is that concerned with caretaker attitudes and perception, for it is the caretaker per se who initially sets the tone and pattern for early reciprocity and who is more personally influential on the infant than a subcultural group, social class, or major culture.

There has been minimal research about correlations between maternal attitudes, perceptions, and expectations of pregnant mothers towards themselves and their infants before and after delivery. The Greenberg (1971) and Greenberg & Hurley (1971) investigations have pointed to the significance of starting early to identify aspects and variables that may greatly influence caretaker-infant reciprocal interactions and child development generally. Investigation into this area would seem especially helpful for

developing support systems for mothers and caretakers both before and after delivery, for helping the caretaker in managing for exceptional infant needs, for altering present systems of obstetrical care, premature care, hospital nursery care, infant day care, and for changing current adoption procedures to benefit caretaker-infant interactions in general and the infant's psychological integrity in particular.

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